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Desert Urbanism : A Historical Civilization Between Resilience and Decline -Tamantit Palace as a Case Study-

العمران الصحراوي بين الصمود والاندثار-قصر تمنطيط أنموذجا-

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- **Abstract:**

Architecture in Algeria, in general, stands as a historical and cultural testament to human ingenuity across its diverse regions, reflecting a continuous evolution through the ages. This significance is particularly evident in the desert regions and the widespread palaces throughout the country, which serve as historical and archaeological landmarks contributing to the creation of both a local and global civilization worthy of recognition. Among the most notable areas is the Touat region in Adrar, distinguished by its unique architectural style that combines mudbrick and stone construction—a clear desert characteristic suited to the harsh geographical environment. This architectural approach effectively met the needs of both local inhabitants and newcomers, establishing the region as a hub for caravan trade and an attraction for tourists and heritage enthusiasts. Tamantit Palace stands out as one of the most prominent landmarks in this area, drawing attention for its architectural beauty and remarkable resilience against environmental challenges. The renowned Arab historian Ibn Khaldun praised the palace's distinctive architecture in his writings, underscoring its important cultural and historical status.

Keywords: Touat, Desert Urbanism, Historic Palaces, Tamantit Palace.

- **الملخص:**

تعتبر العمارة في الجزائر، بصفة عامة، شهادة تاريخية وثقافية على عبقرية الإنسان في مختلف المناطق، حيث تجسد هذه العمارة تطورًا مستمرًا عبر العصور. تتجلى هذه القيمة بشكل خاص في الأقاليم الصحراوية والقصور المنتشرة في ربوع الوطن الجزائري، التي تعد معالم تاريخية وأثرية تسهم في صناعة حضارة محلية وعالمية جديرة بالذكر. من أبرز هذه المناطق، منطقة توات في أدرار، التي تميزت بعمارة فريدة تجمع بين البناء الطيني والحجري، وهي صبغة صحراوية واضحة تتناسب مع البيئة الجغرافية القاسية. وقد ساعد هذا النمط المعماري على تلبية احتياجات السكان المحليين والوافدين، وجعلها وجهة استقطاب للقوافل التجارية، ومقصدًا للسياح ومهتمين بالتراث. يعد قصر تمنطيط من أبرز المعالم في هذه المنطقة، حيث لفت الأنظار بجماله المعماري وقدرته على الصمود أمام العوامل البيئية. وقد أشاد المؤرخ العربي الشهير ابن خلدون، في كتاباته، بالعمارة الفريدة لهذا القصر، مؤكدًا مكانته الثقافية والتاريخية الهامة.

كلمات مفتاحية: توات، العمران الصحراوي، القصور التاريخية، قصر تمنطيط

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- **Introduction**

Architecture constitutes a fundamental element of cultural and historical identity, serving as a reflection of a region's rich heritage and historical narrative. It embodies the collective experiences of the communities that have inhabited the land across centuries. Algerian architecture is remarkably diverse, shaped by its varied geographical settings—from coastal areas to mountainous regions and, notably, its desert landscapes, which host a wealth of distinctive architectural landmarks. Among these, the southwestern region stands out as a prime exemplar of traditional architectural forms. Central to this region is Tamantit Palace, a prominent architectural monument that exemplifies the intricate relationship between human habitation and the harsh desert environment. The palace's construction, characterized by a unique interplay of mudbrick and stone materials, demonstrates a sophisticated adaptation to environmental constraints and testifies to the ingenuity of its builders in devising architectural solutions tailored to desert life.

This study raises the critical question: how can the architectural and historical significance of Tamantit Palace be preserved in the face of temporal deterioration? This inquiry further divides into several sub-questions : What are the defining architectural features of Tamantit Palace ? In what ways did the local population engage with their desert surroundings during the palace's construction ? What challenges threaten the palace's preservation today ?

To address these questions, this research adopts a multidisciplinary methodology combining historical, analytical, and descriptive approaches. The historical method facilitates an exploration of architectural evolution within the Touat region, situating Tamantit Palace within its broader historical context. The analytical framework is employed to scrutinize the palace's architectural attributes and their role in environmental adaptation, while the descriptive method provides detailed documentation of the building's components and structural system. Through this comprehensive analysis, the study aims to illuminate the distinctive features of Touat's desert architecture, with particular emphasis on Tamantit Palace as a paradigmatic example, highlighting its significance in safeguarding Algerian cultural heritage amid ongoing environmental and temporal challenges.

1. Geographical Context and Historical Dimension of Tamantit City

Tamantit is recognized as one of the most prominent regions in southern Algeria where cultural and historical heritage converge. This oasis, rich in cultural and historical diversity, hosts unique architectural landmarks [1] that embody the spirit of human creativity in confronting environmental challenges.

[1] **Architectural landmarks** refer to the tangible physical and spatial elements that constitute the architectural and structural fabric of any society or civilization, playing a crucial role in defining and shaping the cultural and architectural identity of a place. These landmarks encompass buildings and public structures such as mosques, palaces, towers, walls, and mausoleums, as well as open spaces including squares, gardens, and streets. Architectural landmarks serve as essential tools for understanding the historical development of communities, reflecting a range of social, cultural, and religious functions across different periods. They stand as enduring witnesses to the prevailing societal values and architectural philosophies characteristic of specific historical eras.

1.1 Geographical Location

Tamantit is situated within the Adrar Province in southern Algeria, approximately 12 kilometers from the city of Adrar. It is bordered to the north by the municipality of Hbawil, to the south by Fenouil, to the east by Metkatten and Ougrout, and to the west by Bouda. Its geographical position has endowed Tamantit with strategic significance, serving historically as a vital caravan route linking northern Algeria with the kingdoms of sub-Saharan Africa[2]. This key transit corridor profoundly influenced the region's cultural and commercial development. As a result, Tamantit became a hub attracting numerous traders, scholars, and intellectuals throughout the centuries. The interaction of diverse cultures in this oasis has left a notable imprint on its architectural and urban characteristics, shaping its unique built environment[3].

1.2. Historical Overview of the Region

The name "Tamantit" originates from the Amazigh language, composed of two parts : "Atma," meaning "end," and "Tit," meaning "spring" or "water source." When combined, with the omission of the vowel "a," the word becomes "Atmetit," which, through phonetic evolution, transforms the letter "ṭ" (emphatic T) into a soft "t," resulting in "Atmetit" or "Tamantit." This name reflects the geographical position of the region as a boundary or terminal point, located in the extreme southwestern part of Algeria.

The renowned historian Ibn Khaldun mentioned in his work *Al-'Ibar* and *Diwan al-Mubtada' wa al-Khabar*[4] that Tamantit was historically recognized as a significant frontier point. It is one of the prominent oases situated in the heart of the Sahara Desert. Caravan traders from northern Algeria, Mali, western Sudan, and other regions frequently visited Tamantit to replenish supplies of water and dates. Its strategic location and role established it as a vital link for travelers crossing the desert[5].

With the advent of Islam in the Maghreb, Tamantit's importance increased, becoming part of the Touat region—a territory that gained considerable prominence during the Middle Ages, particularly around the mid-12th century CE. During this period, Tamantit saw the influx of various Moroccan tribes such as the Maghrawa and Banu Yaqran[6], who settled in the Touat region and significantly influenced the local culture. In the 13th century, some Arab nomadic tribes migrated to the area, bringing their cultural heritage, which integrated into and enriched the local society.

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[2] Vallee, J. Tamentit, Oasis du Sahara Algérien, Institut Géographique National, Paris, 1973, p. 64.

[3] Al-Hajj Toumi Saidan. The Old Inhabitants of Tidikelt and Self-Reliance. Algeria : Dar Houma, 2005, p. 6

[4] Ibn Khaldun's Al-'Ibar and Diwan al-Mubtada' wa al-Khabar constitute foundational texts for understanding the development of urbanization and civilizations. Through this work, Ibn Khaldun offers a profound analysis of the history of nations and peoples, exploring the factors that contribute to the rise and decline of societies. He examines the interplay of geographical, economic, and social conditions in shaping human development. The book further elucidates the relationship between urban development and social-economic patterns, introducing the concept of 'Asabiyyah (social cohesion or group solidarity), which Ibn Khaldun identifies as a critical principle underpinning the formation of states and the organization of societies. Consequently, Ibn Khaldun's work is regarded as an essential intellectual resource for studying the evolution of cities and civilizations, as well as the intricate relationship between humans, their environment, and urban development.

[5] Ibn Khaldun. Al-'Ibar wa Diwan al-Mubtada' wal-Khabar fi Tarikh al-'Arab wal-'Ajam wal-Barbar wa Man 'Asarahum min Dhawi al-Sultan. Lebanon : Dar Al-Fikr, 2001, p. 118.

[6] **Tamantit witnessed** the influx of several Maghrebi tribes, notably the Maghrawa and Banu Yaqran, both of which played significant roles in the region's history. The Maghrawa tribe, originating from central Morocco, exerted considerable influence on the political and social landscape of the desert region. Meanwhile, Banu Yaqran, another Amazigh tribe with a long-standing presence in the desert areas, was closely associated with various major political regimes. Both tribes were instrumental in shaping the social and economic life of the desert palaces, thereby contributing substantially to the development of these territories.

The settlement of these diverse tribes contributed to Tamantit's cultural plurality and fostered a vibrant intellectual and religious atmosphere. This development elevated Tamantit to the status of a scholarly city and an important religious center, dedicated to preserving and disseminating Islamic law across different regions. Consequently, Tamantit became recognized as the capital of the Touat region[7].

Fig.1. A Map Showing the Strategic Location of Tammanit (Caravan Routes)



Faraj Mahmoud Faraj. *The Touat Region*,... p. 9.

2. Urban Development of Tamantit Palace

2.1. Origins of Tamantit Palace :

The primary purpose behind the construction of the palace was to provide shelter, security, and stability for its inhabitants, ensuring a peaceful life while protecting them from surrounding dangers and threats[8]. Both Ibn Khaldun and Ibn al-Azraq, writing in the ninth century AH, emphasized these fundamental principles in the organization of cities. They stated that two essential considerations must be taken into account : "the first is the prevention of harm, and the second is the provision of benefit.[9]"

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[7] **The Touat region** is recognized as one of the most historically and culturally significant areas in Algeria, serving as a strategic crossroads between the north and south—linking the southern desert oases with the cities of the Islamic Maghreb in the north. This geographical positioning established Touat as a vital hub for trade and cultural exchange throughout history.
Geographically, the Touat region extends from the Tadmit Plateau in the east to the Great Western Erg in the north, stretching westward to the Erg Chech desert, and southward to the Tanezrouft desert. Historically, the region is divided into three main districts : Gourara in the north, Tidikelt in the south, and Central Touat (Tessouat) in the middle. Sources indicate that Touat functioned as a critical link connecting the urban centers of the Islamic Maghreb with the major settlements of Western Sudan, facilitating a flourishing civilization characterized by extensive commercial and cultural exchanges over the centuries. For further details, see : BELLIL, Rachid. Ksour et Saints du Gourara, dans la Tradition Orale, l'Hagiographie et les Chroniques Locales. Mémoires du Centre National de Recherches Préhistoriques et Historiques, Nouvelle série No. 3, p. 20.

[8] Shihab Saad Abdul Karim. Remaining Traditional Architectural Styles in the Western Desert of Egypt : A Comparative Analytical Study. Dar Al-Wafa for Printing and Publishing, 1st ed. Alexandria, Egypt, 2009, p. 11.

[9] Salem Abdel Aziz. History of Morocco in the Islamic Era. Shabab Al-Jamia Foundation, Alexandria, n.d. pp. 441-442.

Fig.3. A picture showing the Tanmattit Palace



Al-Quds Al-Arabi. *"Adrar, Algeria : The City of Ksour and Faqara."* Available at : https://www.alquds.co.uk/... . Retrieved May 16, 2025.

Accordingly, Tamantit Palace was established based on a set of essential conditions aimed at ensuring the continuity of human life, security, and the well-being of its inhabitants. Among the most important of these conditions are :

- **Water and Food Supply :** Water is the most fundamental factor for any human settlement. Therefore, the palace was strategically located near sources of water, particularly fresh groundwater suitable for drinking and agriculture available in the region. This access to water facilitated food production through farming. Additionally, the palace was constructed close to major caravan trade routes, enabling commercial exchange that contributed significantly to the prosperity of the local economy[10].
- **Moderate Climate and Air Quality :** Climate plays a crucial role in selecting city locations, as it is directly linked to public health and disease prevention. Both Ibn Khaldun and Ibn al-Azraq emphasized the importance of these considerations in site selection to minimize the spread of illnesses and pests. Consequently, Tamantit Palace was built in a geographical setting characterized by a relatively favorable climate conducive to human settlement[11].
- **Pasture and Firewood :** Ibn Khaldun and Ibn al-Azraq also highlighted the significance of accessible pastures, considering “good grazing land for livestock and its proximity”[12] as vital factors in choosing a site. The availability of pastures simplified obtaining food for animals. Furthermore, the presence of trees for firewood attracted inhabitants to settle at the palace, as firewood was used for heating and cooking, while timber served as a primary building material[13].

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[10] Hamdan Jamal. Geography of Cities. Cairo, 1977, p. 3.
[11] Ibn al-Azraq. Bada’i’ al-Silk fi Taba’i’ al-Mulk. Edited by Muhammad Abdul Karim, Dar Al-Arabiya lil-Kitab, 1977, Vol. 1, p. 765.
[12] It is noteworthy that Tamantit is renowned for its palm oases, whose proliferation has been facilitated by the favorable climate. These oases have served as a primary source of livelihood and sustenance for the local population. Moreover, various parts of the palm trees have been utilized in construction, as fuel for heating, and even as fodder for livestock.
[13] Ibid., p. 766.

- **Fortification and Wall Construction:** Fortification constitutes a fundamental criterion in selecting the site for a city or palace, intended to protect inhabitants from external threats, especially during enemy attacks. As settlements expanded and wealth increased, fortifications became an urgent necessity, prompting the construction of surrounding walls for cities and villages. According to both Ibn Khaldun and Ibn al-Azraq, the building of walls and external barriers is among the most critical factors in ensuring security, as it safeguards the community against attacks by adversaries seeking to seize wealth or loot settlements. Accordingly, Tamantit Palace was equipped with protective walls to defend its inhabitants against banditry[14].

2.2. Historical Phases of the Development of Tamantit Palace

2.2.1. African Architecture in the Tamantit Region:

This architectural style dates back to the Geotelian period (circa 100 BCE)[15], when the Geotelians established cities characterized by pyramidal and conical structures. This influence is clearly manifested in Tamantit Palace[16], where such architectural forms emerged because of the interaction between its inhabitants and Sudanese cultures. These cultural exchanges were driven by commercial and civilizational trade between African civilizations. Moreover, contact with West African populations, such as those from Kano[17], through familial and social ties, further shaped the architectural character of the palace[18].

2.2.2. Berber Architecture (also known as Bermaki Architecture):

This style is distinguished by the use of stone and mud as primary building materials and is typically found in elevated locations. It is characterized by defensive features, including narrow, winding alleys and houses directly connected to the outer walls. Unlike many palaces, Berber architecture generally lacks the presence of an open courtyard (rahba). Corner towers are a notable feature. Examples include Bouali Palace (in the municipality of Zaouia Kenta), as well as the palaces of Sali, Timadnin, and Tawarit (in the municipality of Reggane), Algeria[19].

2.2.3. Jewish Architecture in the Tamantit Region:

Jewish architectural forms are notable for their circular layout, differing from Berber styles. Typically, a single tower stands at the center of the palace, surrounded by main and secondary alleys, with subterranean rooms (dahalis). These palaces are constructed from similar local

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[14] Ibid., p. 766.

[15] **The Geotelian Era** (circa 100 BCE) represents a significant historical period in North Africa, during which the Geotelian communities experienced advancements in agriculture, pottery, and architectural structures. This era was characterized by the use of local building materials, such as stone, which were well-suited to the desert and mountainous environments. Moreover, it played a foundational role in shaping the social and cultural frameworks that influenced architectural developments in subsequent periods, including the Roman and Islamic eras, particularly in the construction of desert palaces.

[16] Nadir Marouf, Lecteur De L'espace Oasien, Paris : Sendabad, 1980. P-39

[17] **Kano,** a significant urban center in northern Nigeria, is known for its ancient defensive walls, traditional markets, and mud-constructed architecture. It serves as a crossroads for trade between West Africa and the Arab world. The city also houses numerous historic mosques and shrines.

[18] Hussein Abdel Hamid Ahmed Rashwan. The City : A Study in Urban Sociology. Modern University Press, Alexandria, 6th ed. 1998, p. 168.

[19] Bouali, Sali, Timadnin, and Tawarit palaces in Zaouia Kenta, Reggane, share architectural similarities with Tamantit Palace, reflecting desert adaptations. They feature communal courtyards, mudbrick and adobe walls, and stone roofs. These palaces are situated near watercourses, enhancing access to agriculture. They continue to host traditional celebrations and festivals, reflecting Maghrebi tribal cultures, particularly the Maghrawa and Banu Yaqran tribes.

materials, such as stone and mud, and are usually situated on elevated ground. Prominent examples include the Tazult Palace in Zaouia Kenta and the Palace of Ouled Maimoun. The construction of these palaces dates back to the arrival of Jewish communities in the region following their displacement, especially between the 1st and 6th centuries CE. It is believed that Jewish groups established some of the Tamantit palaces, such as Ouled Hamali and Ouled Maimoun Palaces. A Jewish temple was discovered in Ouled Hamali Palace, alongside an inscription dating to 517 CE, indicating a Jewish presence in the region during this period. In the 16th century, certain Arab tribes converted this temple into a mosque[20].

2.2.4. Arab-Islamic Architecture:

Tamantit reflects a profound influence of Islamic society. Muslim-founded cities primarily centered around the construction of mosques and shrines, and accordingly, Tamantit saw the establishment of various religious structures such as zawiyas (Islamic religious schools or monasteries) and mausoleums. From an architectural perspective, Islamic cities emphasize two integrated dimensions : the social dimension, where architecture both influences and is influenced by the community environment, and the individual dimension, reflecting personal needs and practices. These principles shaped many aspects of Islamic architectural planning in Tamantit, particularly during periods of Arab tribal presence, such as the Almoravids, who left a distinct imprint on the city's design, especially regarding the development of desert palaces. Furthermore, Islamic architecture in Tamantit incorporates designs that support the region's social and economic activities, including trans-Saharan trade, which was a key factor in the emergence of these palatial structures[21].

3 Architectural Characteristics of Tamantit Palace

The significance of Tamantit lies in its architecture as a diverse built heritage intimately connected to its historical context. It reflects the collective mindset of the tribes that inhabited the region across different periods. Architecture serves as a living record and an open book through which we can understand the lives, customs, relationships, politics, and cultures of peoples throughout history[22].

3.1 Building Materials :

The architectural importance of Tamantit is particularly evident in its construction materials and techniques, especially in the palace and its auxiliary structures. These manifest an authentic architectural art form, built using locally available materials well adapted to the desert environment[23]. Remarkably, the structures have endured the passage of time, alongside careful considerations in the palace's planning and positioning—such as elevation, orientation of passageways, and other design elements. All these measures served preventive, health-related, or functional purposes[24].

The built heritage of Tamantit predominantly involves the following materials :

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[20] Boualala Djelloul. Tamantit Palace : An Archaeological and Architectural Study. Graduation Thesis for the Degree of State Engineer in Architecture, Department of Architecture and Archaeology, Algeria, 2005, p. 25.

[21] Hosni Abdel Hafiz. "Urban Planning and Architecture in Islamic Civilization." Al-Madina Al-Arabiya, Issue 113, March-April 2003, p. 41.

[22] Faraj Mahmoud Faraj, previously cited, p. 66.

[23] Heqaq Ibrahim. "The Social and Cultural Dimensions of Desert Architecture Patterns in Algeria," published in Al-Insan wal-'Imara, Ninth Symposium, Sokhri Press, El Oued, Algeria, 2013, p. 156.

[24] Hosni Abdel Hafiz, previously cited, p. 48.

- **Stone :** Stones are quarried from nearby local sources, which are abundant, leading to their widespread use. These stones were generally left unpolished and unrefined, exposed in the construction, reflecting a raw, natural aesthetic. Stones were extensively used in the residences of Tamantit Palace, especially during its early phases such as the Ouled Hamali Palace, primarily in the foundations, walls, and staircases.
- **Clay (Mud) :** Clay was widely favored by the inhabitants of the desert palaces and was used as a binding and cohesive agent for stones and bricks. It functions as an effective insulator, keeping interiors cool in summer and preventing cold infiltration in winter. The clay's color varies according to the mineral content present. Typically, it was sourced from valley edges or excavated soil transported to the construction site. In Tamantit, clay was utilized in building walls (bricks), plastering both interior and exterior surfaces, as mortar to bond different elements and fill gaps, and as a medium for decorative surface finishes.
- **Brick :** Bricks were used extensively in the construction of desert palace facilities generally, and Tamantit Palace specifically. They came in various sizes and shapes, primarily due to the availability of raw materials such as clay, fine sand, and stabilizers. The bricks were easily molded by hand or shaped using wooden rectangular molds and then dried. Architectural structures in Ouled Ali bin Moussa and Ouled Dawoud in Tamantit were constructed with these bricks. Other materials included wood, primarily palm trunks and branches from desert trees, which were employed in roofing[25].

Fig.4. Traditional Building Materials



Boualala Djelloul. *Tamantit Palace….p66.*

3.2 Architectural Components of Tamantit Palace

Tamantit Palace features distinct spatial and architectural forms characteristic of desert towns. These spaces are largely harmonious with the social functions and structure of the community and are adapted to the natural environmental conditions. The palace's architectural components include :

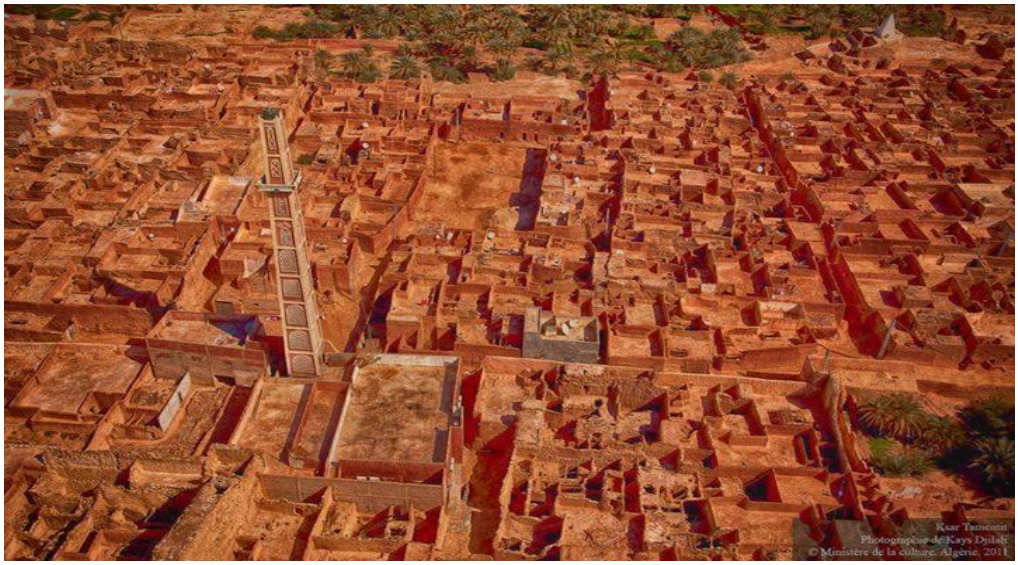
3.2.1 Residences :

In ancient desert cities, residences are characterized by a cohesive and interconnected architectural design, where houses cluster tightly around one another within the city's enclosing walls. These dwellings are generally uniform in size, rarely exceeding 90 square meters. They are arranged in a cumulative pattern reminiscent of a honeycomb within the fortifications. This intricate interweaving renders it difficult to study individual homes in isolation, except within the

[25] Ibid., p. 48.

broader framework of the enclosing fortification, commonly referred to as the qasba or citadel. Notably, the design of these houses has remained remarkably consistent over the centuries, reflecting a continuous architectural heritage[26].

Fig.5. General View Of The Tamantit Housing.



Algeria Press Service. (2018, April 18). *Reopening of Tamantit Archaeological Museum in Adrar*. APS. Retrieved May 16, 2025, from https://www.aps.dz/ar/culture/55634-2018-04-18-11-44-50

3.2.2 Towers :

Towers represent a prominent architectural feature of desert palaces, with their remains still bearing witness to the grandeur of this building tradition. These towers typically have a pyramidal shape, broad at the base and gradually narrowing towards the top, and are usually positioned at the corners of the palace. Inside, the towers contain staircases and embrasures designed for monitoring enemies. The lower sections often serve as storage spaces for agricultural produce and communal belongings. The defensive role of these towers was crucial, enabling inhabitants to observe approaching invaders from a distance and prepare for their defense accordingly.

Historically, the guarding of these towers involved teams of both men and women ; notably, women sometimes participated actively in defense by pouring boiling water from the tower tops to repel attackers[27].

3.2.3 The Wall (Fortification) :

Ancient cities in general, and desert palaces in particular, were distinguished by the presence of defensive walls, which served as a fundamental element of protection, especially in the absence of natural mountainous terrain that could provide natural defense. These walls took various shapes—circular, square, or rectangular—depending on the palace's design and the era in which it was constructed.The walls could reach heights of six meters or more, and historically, they were even thicker. Some historical sources indicate wall thicknesses of up to two meters, wide enough to allow two horsemen to pass side by side along their tops[28].

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[26] Ben Hamouch Mustafa. The Essence of Islamic Urbanization : Studies in the Jurisprudence of Urbanism. Dar Qabis for Printing and Publishing, 1st ed. Beirut, 2006, p. 21.

[27] Terrasse (H), Burdj (Art), I.L'architecture militaire dans l'Occident Musulman, encyclopédie de l'Islam, T1, nouvelle edit, Brill, Paris, 1975, P1360.

[28] Ibn Hattal Ahmed. The Journey of Muhammad al-Kabir : Bey of Western Algeria to Southern Algeria. Edited and introduced by Muhammad Ben Abdul Karim, 1st ed. Alam Al-Kutub, Cairo, 1969, p. 5.

For example, at Tamantit Palace, horses would patrol the walls day and night as part of the guard duty, with watchtowers integrated into the fortifications. Beyond their defensive function, living within the walls symbolized safety and belonging, whereas residing outside them represented exposure to danger and isolation. This underscores the palace's dual role as both a defensive stronghold and a social center[29].

Fig.6. General View of the Palace Wall



Cartes du patrimoine culturel algérien. (n.d.). *Qsar Tamentit*. Retrieved May 16, 2025, from https://cartes.patrimoineculturelalgerien.org/ar/lieu/01-adrar/851 3.2.4 The Rahba (Central Courtyard) :

The *rahba* represents the central open space at the heart of the palace, serving as a vibrant communal and public area that encompasses various aspects of daily life for its inhabitants. Surrounded by adjacent buildings and intersected by all alleys and pathways, it functions as a key circulation and distribution node within the palace complex. Far from being merely an empty space, the *rahba* has historically played multiple roles over time. It served as the venue for seasonal celebrations and traditional festivals, as well as a daily gathering place for children and youth, especially during the evenings. In the past, the *rahba* was also a commercial hub where caravan traders prepared for departure and rested upon their return. Today, it has evolved into a playground for children, fulfilling an important educational and social function in the absence of dedicated recreational spaces. This continuity underscores the *rahba*'s role as a dynamic site that continues to meet the evolving needs of the desert community[30].

3.2.5 Alleys :

The alleys in desert palaces are characterized by their winding, covered design, leading to various neighborhoods and communal spaces such as mosques and public squares. They are classified into two types : public, through alleys that provide open passage, and semi-private, dead-end alleys serving only the adjoining houses. These alleys are notably narrow, rarely exceeding 1.5 meters in width, allowing the passage of laden donkeys. They feature small openings that provide natural lighting and guidance for pedestrians. The covered nature of the alleys serves both social and climatic purposes : it enables women to move about without veils and offers shaded resting

[29] Al-Qazwini. Athar al-Bilad wa Akhbar al-'Ibad, pp. 7-8.
[30] Al-Mukhtar Al-Harras and Idris Ben Said. Social Transformations in the Moroccan Rural Areas. Publications of the Faculty of Arts and Humanities, Symposium and Conference Series No. 2, 1st edition, 2002, Rabat, p. 154.

places for men during hot periods. Additionally, the coverings reduce the impact of direct sunlight and facilitate ventilation. Functionally, these alleys resemble the Moroccan *sabat*—covered walkways used to provide shade and reduce the presence of flies. Structurally, the alleys connect buildings into a cohesive mass, enhancing the overall stability of the architectural complex[31].

3.2.6 Doors :

Doors serve as gateways to the city and critical points of connection between the interior and exterior of the palace, while also playing a key role in its fortification. They delineate the boundaries between public and private spaces and separate different quarters within the settlement. Traditionally, these doors were closed at night and opened during designated hours in the daytime to maintain security and regulate movement, particularly during the early decades of the twentieth century[32].

3.2.7 The Oasis :

The oasis consists of agricultural holdings owned by families and is typically located near the palace in a low-lying area to ensure the flow of *foggara*[33] irrigation water. The oasis plays a vital role in the morphological and economic structure of the palace, providing essential building materials such as palm fronds and trunks, while also serving as an important food source for the inhabitants. Economically, the oasis supports agricultural activities closely tied to social customs and practices, including systems such as *Khamsa* and *Khrasa.*

3.2.8 The Mosque:

The mosque constitutes the most important element within Tamantit, serving as the religious and spiritual center of the palace. Its significance is highlighted by its prominent location at the heart of the palace and its distinctive architectural design, which features a tall, pyramidal minaret. Careful consideration is given to its placement, ensuring it occupies a central position surrounded by the main square, towards which the village streets converge. This strategic positioning establishes the mosque as the focal point of religious and social life for the palace's inhabitants[34].

3.2.9. Mausoleums:

Surrounding Tamantit Palace is a cluster of mausoleums[35] distinguished by their white color and imposing forms. They are predominantly concentrated around the palace precincts, while fewer mausoleums appear in various locations such as ancient cemeteries, fields, roadside edges, or adjoining mosques. These mausoleums are constructed using local materials like clay and adobe, coated with limewash that is renewed annually. This treatment gives the structures a bright white appearance and enhances the durability of their walls. The roofs are notable for their absence of wood or plant-based materials; instead, they are covered with smoothly polished stone arranged in a pyramidal shape, topped by a dome.

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[31] Mohamed Ali Abdel Hafiz. Studies in the History of Islamic Architecture, 2nd ed. 2003, p. 7.

[32] Ibid., p. 25.

[33] The foggara system is a traditional method that improves irrigation systems in arid and semi-arid regions by transporting groundwater underground. It enhances crop production, reduces water evaporation, and contributes to agricultural sustainability by providing efficient water supply. See Hamed Lamin Ibrahim, "The Importance of the Foggara System in Agricultural Activity in the Touat Region during the 13th Century AH / 19th Century AD," Afaaq Ilmiya Journal, Issue 11, M.J. Temengest, 2016, pp. 11–18.

[34] Colvin (L), La Mosquée des origines, sa morphologie ses diverses fonction, son rôle -306 dans la vie Musulmane plus spécialement en Afrique de nord, Alger, 1960, PP 15-16.

[35] **Mausoleums** in Islamic Maghreb palaces are revered sites for saints, serving as sites for supplication and prayer. They are whitewashed with lime on the saint's death anniversary, adding a distinctive shine. The "Day of the Visit" (Yawm al-Ziyara) is an annual celebration filled with ritual dances, traditional songs, and religious hymns.

3.2.10 the Cemetery:

Located outside the city, the cemetery is locally known as *"Lmadina"* (with a pronounced "m") and functions as a self-contained city for the deceased, extending over a considerable area. It often includes a funeral prayer area (*musalla*) and contains mausoleums. In larger palaces with high population density, multiple cemeteries may exist, each designated for a specific social class or family. Social distinctions are strictly maintained even in burial practices; only individuals belonging to the same lineage or social group are permitted to be interred within a given cemetery. This practice reflects the persistence of social identity into the afterlife[36].

4. Factors Influencing the Sustainability of Tamantit Palace : Between Resilience and Decay

Tamantit palaces constitute a vital part of the desert architectural heritage, reflecting the authenticity and historical legacy of the region. However, these architectural landmarks face significant challenges that threaten their continuity, stemming from the interplay of various natural, human, and biological factors. Constructed using local materials such as clay and adobe, these palaces have endured the impacts of their surrounding environment over time, compounded by a declining role of human maintenance. This situation necessitates a thorough study and analysis of the causes of deterioration in order to develop sustainable solutions that safeguard this unique architectural heritage.

The factors contributing to the deterioration of Tamantit palaces can be broadly categorized into three main groups :

- **Natural factors :** Including harsh climatic conditions and environmental changes.
- **Human factors :** Pertaining to irresponsible practices and urban neglect.
- **Biological and animal factors :** Encompassing the impact of animals and insects on the physical structure of the palaces[37].

4.1 Natural Factors :

Tamantit palaces suffer from multiple adverse effects due to the harsh natural conditions characteristic of the surrounding desert environment.

Firstly, these palaces are exposed to extremely high temperatures during the summer months, which severely affect the durability of the mudbrick and adobe walls that rely on moisture to maintain cohesion. Prolonged drought exacerbates the problem by causing cracks and gradual deterioration of the walls over time. *Secondly*, the constant blowing of sandstorms poses an additional threat to the architectural structure. These storms cause continuous erosion of walls and exterior surfaces, gradually stripping them of their original appearance and integrity. Accumulated sand often blocks openings and windows, further complicating the preservation of the internal environment of the palaces. *Thirdly*, water scarcity in the region stands out as one of the most significant natural challenges impacting the sustainability of these palaces. The reliance on traditional *foggara* irrigation systems, which serve as the primary water source, is increasingly threatened due to climate change and lack of adequate maintenance. The decline of these systems

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[36] Ibn Hattal Ahmed, previously cited, p. 33.

[37] Hazaar Imran and George Daboura. Historic Buildings : Restoration, Maintenance, and Preservation. Publications of the Ministry of Culture, Directorate General of Antiquities and Museums, Syrian Arab Republic, Damascus, 1997, p. 78.

leads to desertification around the palaces, weakening soil cohesion and making it vulnerable to erosion. This also negatively affects the surrounding trees and vegetation, which historically played a crucial role in protecting the palaces from wind and sand intrusion[38].

4.2. Human Factors and Their Negative Impact on Tamantit Palaces

Tamantit palaces have experienced significant deterioration due to human influences and detrimental practices that have accelerated the loss of their traditional functions. One of the most prominent issues is the lack of attention to maintenance and restoration. A declining awareness of the importance of these heritage landmarks has resulted in neglect, leaving them vulnerable to erosion and structural collapse. This neglect has been exacerbated by a decreasing local population density, driven by migration to major cities in search of better living conditions, thereby reducing the number of individuals invested in the preservation of the palaces. Furthermore, uncontrolled urban expansion has played a major role in their degradation, with surrounding lands being converted into agricultural fields or modern construction zones without regard for the traditional architectural character. This urban transformation has disrupted the palaces' spatial organization and obscured their original features.

Social and economic changes have also had a marked negative impact. As lifestyles evolved, residents abandoned traditional building materials such as mud and adobe, replacing them with modern materials incompatible with the desert environment. This shift not only undermined the sustainability of the palaces but also contributed to the decline of traditional skills essential for their construction and upkeep[39].

Additionally, harmful human practices such as using the palaces as storage facilities or unmanaged animal grazing areas have damaged walls and interior surfaces. Poor urban planning has further aggravated issues like the neglect of traditional irrigation systems such as *foggara*, diminishing the efficient use of natural resources linked to these structures[40].

Finally, the absence of clear heritage protection policies and the scarcity of awareness programs regarding the importance of preserving historic palaces have perpetuated neglect, threatening the loss of this cultural legacy that embodies the region's history and identity.

4.3 Biological and Animal Factors and Their Negative Impact on Tamantit Palaces

Biological and animal factors constitute one of the primary causes of deterioration in Tamantit palaces, with animals playing a significant role in this context. Camels, goats, and other livestock are often raised near the palaces, frequently using these areas as grazing grounds or shelters. This continual use leads to the erosion of mud walls due to daily physical contact or moisture infiltration resulting from the accumulation of animal waste in surrounding areas. Such conditions weaken the structural integrity of the walls, making them more prone to cracking and collapse. Additionally, insects—particularly termites—pose a serious threat to mud and adobe structures by hollowing out the building material from within. This damage is often structurally severe yet remains undetected until it becomes critical. Agricultural pests prevalent in the vicinity also affect local vegetation, which plays a vital role in stabilizing the soil and protecting the palaces from erosion. Plants like palm trees, once integral to the agricultural systems surrounding the

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[38] Giorgio Torak. Material Technology and the Maintenance of Historic Buildings. Translated by Ahmed Ibrahim Atiya, Dar Al-Fajr for Publishing and Distribution, Hashim Al-Shaqr Street, New Tarha, Cairo, p. 205.
[39] Hazaar Imran and George Daboura, previously cited, p. 87.
[40] Ibid., p. 102.

palaces, have suffered from neglect and overharvesting, leading to exposed soil vulnerable to wind erosion and infrequent but intense rainfall. This erosion directly undermines the stability of the palaces' foundational bases.

Moreover, birds nesting within cracks in walls and mud roofs contribute to the gradual erosion of these structures. Their constant activity widens existing fissures and weakens the overall fabric. The moisture introduced through their droppings further increases wall dampness, accelerating the deterioration process[41].

Overall, the lack of regulation over animal and agricultural activities near the palaces, combined with the absence of adequate measures to protect them from pests and animals, has significantly accelerated the deterioration of these historic landmarks.

Conclusion :

Based on the foregoing, it can be asserted that :

- The Tamantit region possesses a strategic location that has attracted numerous tribes, contributing significantly to the enrichment of its cultural and intellectual life.
- Tamantit Palace occupies a strategic position at the crossroads of important trade routes, making it a convergence point for various tribes and cultures that have influenced its cultural and intellectual development.
- Desert Architectural Character : The palace exemplifies a traditional desert architectural style that integrates religious, civil, and defensive elements, tailored to the needs of its inhabitants and the geographical and climatic conditions of the region.
- Defensive Features : The palace is equipped with defensive architectural elements such as walls and towers designed to protect residents from external attacks, highlighting its role as a center of security and stability.
- Cultural and Artistic Heritage : Tamantit Palace reflects a long history of interaction between local inhabitants and diverse tribes, establishing it as a rich cultural and intellectual hub characterized by customs and traditions passed down through generations.
- Diverse Urban Patterns : The palace showcases a variety of architectural design, including traditional residences, mosques, religious schools, and social facilities that meet the needs of the local community.
- Environmental Influences : Its architecture is shaped by the surrounding desert environment, utilizing local materials resistant to harsh desert conditions such as extreme heat and strong winds, thereby ensuring the building's adaptation to these challenges.
- Community Identity : The palace is an inseparable part of the identity of Tamantit's inhabitants, reflecting not only architectural dimensions but also the social and historical culture of the region.

Nonetheless, Tamantit Palace has faced a range of challenges affecting its preservation, particularly regarding residents' attachment to their homes and apprehension toward continuous modernization, which conflicts with the palace's traditional architectural character.

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[41] Arab Organization for Education, Culture and Science, previously cited, p. 361.

Therefore, safeguarding Tamantit Palace requires the concerted efforts of all relevant stakeholders—from archaeological and architectural authorities to cultural associations, the Directorate of Culture in Adrar Province, and the municipality of Tamantit.

Preserving Tamantit Palace must be pursued within a framework of sustainable development to ensure its longevity and protect it from extinction.

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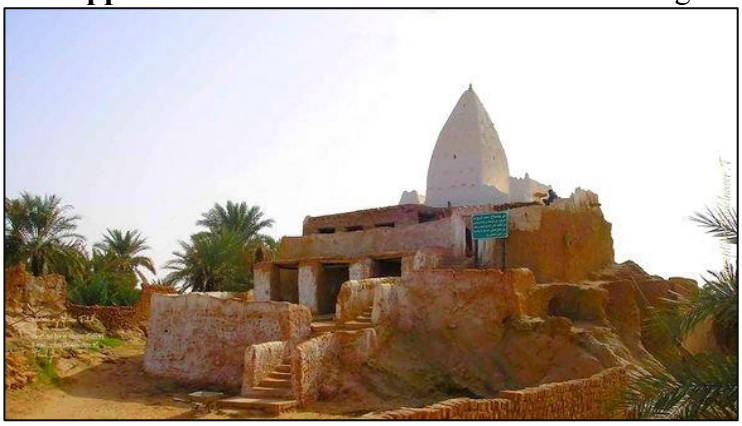
Appendix:

Appendices .1. Qsar Tamentit



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